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THE PRESENT STATUS OF VACCINATION AGAINST DISEASE*

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During recent years a great deal has been learned about the antigenic structure of the pathogenic bacteria in relation to virulence and the existence of serologic specific types which have greatly improved our methods for vaccination or active immunization against them. Methods have also been evolved for the cultivation of some of the viruses with the production of effective vaccines, so that one may approach a discussion of active immunization against disease with much satisfaction with present day results and with the justifiable expectation that further triumphs in vaccination against disease will be realized.

Principles. Successful active immunization depends primarily upon whether or not vaccines are capable of producing sufficient antibodies to result in immunity. It is true that their therapeutic efficacy may depend in part upon non-specific effects but these play little or no role in prophylaxis. Curiously and for reasons not understood at present some of the bacteria in vaccines are incapable of producing effective immunity. This is true, for example, of the gonococcus. Apparently it is lacking in antigenic substances so that even recovery from an attack of disease leaves no immunity to subsequent attacks. Indeed, it would appear that there is little or no hope of evolving methods for vaccination against those diseases which produce little or no immunity following natural infections.

Furthermore, there are diseases like syphilis and tuberculosis where immunity is acquired only by actual infection called "infection immunity." In these only the living organisms appear capable of producing antibodies and resistance, the latter being largely of the tissue type. For this reason all efforts to vaccinate against tuberculosis with vaccines of dead tubercle bacilli have failed and the same is true of vaccines of killed *Treponema pallidum*. For this reason the only immunity acquired in tuberculosis and syphilis is that engendered by actual infection; apparently it endures only in case of persistent infection and may be so low in effectiveness as to fail in protection against superinfection or the extension of existing disease.

The same is largely true of vaccines of the viruses in the sense that their antigenic activity is mostly dependent upon a living state. It is true that the virus of rabies killed with phenol, as in the Semple vaccine, may produce immunity but many believe that its actual immunizing value is largely due to the presence of traces of living virus escaping destruction and that this may very occasionally produce "treatment paralysis." It is also true that vaccines of formalized cultures of the virus of equine encephalomyelitis apparently possesses antigenic activity but successful vaccination against smallpox and yellow fever require the use of attentuated but living viruses and I am convinced that the same is required for effective active immunization against infantile paralysis.

As a general rule most of the living viruses are highly antigenic so that recovery from their diseases leaves a highly effective and enduring immunity. Others, however, like the common cold and influenza, produce little or no immunity since frequent attacks are so common; consequently, in these there is not much hope of producing effective methods of vaccination although this remains to be determined by present and future investigations.

Fortunately the exogenous toxins or their toxoids are highly vaccinogenic with the re-

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sult that safe and effective methods are available for active immunization against diphtheria, scarlet fever and tetanus, along with the hope and expectation that the toxoids of the anaerobic bacilli of gas gangrene will also be eventually found effective in vaccination against this disease. Under the circumstances methods employed for the preparation of stock and autogenous vaccines for therapeutic purposes should always include the exogenous toxins which may be produced by bacteria in broth cultures which includes the majority of those producing disease.

Fortunately, mixed vaccines may be employed for active immunization since it has been shown that two or more organisms or their toxins in the same vaccine will engender effective immunity against each. This has been shown by the successful results attending vaccination against typhoid and the paratyphoid fevers with a mixture of these organisms and it is stated that even the cholera and dysentery bacilli may be included; also the fact that there is now a growing tendency to vaccinate children simultaneously against diphtheria and tetanus by including their toxoids in the same vaccine.

Practical Value. In judging the value of any vaccine for the prophylaxis of disease, the final test must always be empirical—does it work in practice? There may be excellent reasons for expecting that a particular vaccine will lower the incidence and mortality of a particular disease, but until the method in question has been extensively tried under field conditions, we can never be sure what its actual value will be and this is not as easy to determine as might be supposed.

But the medical profession can point with pardonable pride to the fact that *vaccination is highly effective* against smallpox, diphtheria, typhoid and paratyphoid fever, rabies, tetanus, scarlet fever and the "jungle" type of yellow fever; also that *vaccination is somewhat effective* against bubonic plague, Asiatic cholera, Rocky Mountain spotted fever, typhus fever, equine encephalitis of man, bacillary dysentery and the secondary infection of the common cold.

Indeed it may be stated that active immunization is to be routinely advised against the following diseases and preferably at the ages specified in view of their high incidence:

Pertussis—6 months

Smallpox—9 months, with re-vaccination at 6 years

Diphtheria—12 months with Schick test at 6 years or Diphtheria and Tetanus Toxoids combined

Scarlet fever—3-4 years

Typhoid fever—8-12 years.

It is important for physicians to realize their responsibility in urging and practicing vaccination against these diseases instead of relying on the state to do so. It is true that protective degrees of immunity are not always obtained and that it may last only a few years but it is likely that vaccination against diphtheria, scarlet fever, pertussis, typhoid fever and tetanus sensitizes the body itself so that immunity is subsequently prolonged and increased through reenforcement by clinically unrecognized exposures and their infections sufficient for stimulating further antibody production.

While it is not possible to discuss vaccination against these diseases in detail, yet a few pertinent remarks on each may be helpful. Since yellow fever, bubonic plague, Asiatic cholera and epidemic typhus fever do not occur in the United States, they may be omitted from further discussion although it is possible that physicians in the future may be called upon to deal with them since the growth of international air travel renders more liable the introduction of insect vectors and infected individuals during the incubationary stages into our midst. Thanks to the vigilance of our health authorities, however, we have so far escaped them.

Smallpox. In those countries where cowpox vaccination is universal and compulsory, smallpox has been practically exterminated. But the United States is in the unenviable position of having about 10,000 cases yearly due largely to the fact that only ten states have compulsory vaccination laws. Every child should be vaccinated before two years of age and again at six years because the immunity does not always endure for the balance of life. For this reason re-vaccination is again advisable at about the age of puberty and always upon exposure to the disease.

Cultivated cowpox virus may be employed by intracutaneous or cutaneous inoculation but I believe that the regular calf lymph is to be preferred. Undoubtedly, the multiple puncture method should be employed. Shields are inadvisable but the vaccinal wound should receive care against scratching and undue secondary bacterial infection. Fresh and potent virus is required and vaccination is preferred during the colder months of the year because the virus is susceptible to heat and failure of successful vaccination is usually due to the use of dead or devitalized virus. One inoculation usually suffices but two inoculations are advised in case of failure of previous vaccination, when in doubt regarding the potency of the virus, in case of exposure to smallpox and when the individual is not likely to return for re-vaccination in case of failure. The arms are preferred but the legs may be employed.

The use of cowpox virus has completely eliminated the danger of syphilis, leprosy and tuberculosis due to vaccination. Severe local lesions and excessive scarring due to secondary infection are largely preventable by proper technic and after-care. Tetanus is not due to the presence of bacilli or spores in the virus but to accidental secondary infection. Encephalomyelitis is rare but dangerous. It is largely preventable by vaccination before 2 or 3 years of age and during the colder months of the year.

There is no doubt in the minds of unbiased persons regarding the value of vaccination against smallpox. Before universal vaccination history has shown its fearful morbidity and mortality. At present smallpox by comparison is very uncommon thanks to vaccination. However, this has fostered a certain degree of false security and carelessness in carrying out the process with a young and new generation of unvaccinated persons, a source of danger in any community. Not a few physicians who have seen the ravages of smallpox are ready to shoulder the challenge of the late Osler to antivaccinationists:

"I would like to issue a Mount Carmel-like challenge to any ten unvaccinated priests of Bail. I will go into the next severe epidemic with ten selected vaccinated persons and ten selected unvaccinated persons. I should prefer to choose the latter—three members of Parliament, three antivaccination doctors, if they could be found, and four antivaccination propagandists. And I will make this promise, neither to jeer nor to jibe when they catch the disease, but to look after them as brothers and for the four or five who are certain to die, I will try to arrange the funerals with all the pomp and ceremony of an antivaccination demonstration."

To the best of my knowledge this challenge has never been accepted and I do not expect that it ever will be.

Diphtheria. The striking and abrupt reduction in the morbidity and mortality of diphtheria in localities where vaccination against diphtheria has been extensively applied leaves no doubt that it can be effectively eradicated through universal practice of active immunization. But this would have to be compulsory and on a national basis, because of interchanging populations. To facilitate universal acceptance of vaccination against the disease the method employed should, as nearly as possible, comply with the following requirements: (1) the vaccine employed should be safe with little or no local and systemic reactions; (2) the number of injections should be reduced to a minimum; (3) the vaccine should not sensitize to serum and (4) the method should effect a lasting immunity as nearly as possible.

As previously stated, all children should be immunized before two years of age. The Schick test is not required as the great majority are susceptible to diphtheria. Children should be Schick tested, however, at 5 or 6 years of age and the positive reactors re-immunized. Older children and adults should always be Schick tested as only the positive reactors require vaccination.

Toxin-antitoxin (T-A) is seldom employed at present except in adults and children over 12 years of age. Three doses of 1 cc. are required by subcutaneous injection at weekly intervals with a Schick test 6 months later. It is effective in 75 to 90 per cent of Schick-positive individuals.

Plain or soluble toxoid is preferred to T-A for children under 12 years of age. Two doses of 0.5 or 1 cc. each are given by subcutaneous or intramuscular injection with an

interval of 3 to 4 weeks and a Schick test 3 months later.

Alum-precipitated toxoid, however, is preferred for young children because of slower absorption. One dose of 1 cc. may be used for mass immunization but in private practice two doses (0.5 or 1 cc. each) by subcutaneous or intramuscular injection with an interval of 3-4 weeks is preferred. A preliminary test for allergic sensitivity to toxoid (Moloney reaction) is advisable in individuals over 12 years of age; if positive, it is advisable to split the dosage or to give with adrenalin.

The toxoids are effective in 90 to 98 per cent of Schick-positive individuals. They protect over the age of greatest susceptibility and doubtless the acquired immunity is prolonged by natural immunization for the balance of life in the great majority. Schick-negative individuals, however, may contract diphtheria from infection with unusually virulent diphtheria bacilli like *B. diphtheriae gravis* but these are rare. Furthermore, it must not be forgotten that vaccinated and Schick-negative individuals may be carriers of virulent diphtheria bacilli and these constitute the greatest menace to public health.

Tetanus. The practical value of vaccination against tetanus has not yet been clearly defined but there is an increasing consensus that it is advisable in the case of those whose occupation renders them particularly liable to injury and the danger of tetanus infection. Active immunization is being used on a large scale in the armies of Great Britain, Italy and the United States. In civil life the incidence of tetanus is so low that mass immunization has not been proposed although the frequency of automobile and other injuries with the danger of tetanus may soon render this worthy of serious consideration. Indeed, it is now thought by many physicians that it may be advisable to immunize all children routinely by a mixed vaccine of the toxoids of diphtheria and tetanus, given in two doses of 1 cc. each with an interval of 3 to 4 weeks.

For adults, two doses of alum-precipitated tetanus toxoid of 1 cc. each are given with an interval of 3 or 4 months. But it is advisable to follow up with a single dose of 1 cc. every year or every two years for the maintenance of immunity.

It must be emphasized that the vaccine has no therapeutic value and should never be given during the course of the disease. Furthermore, because of the slowness of antitoxin production it should never be used for prophylaxis at the time of an injury in a person who has not been previously immunized. The crux of the matter, however, is what to do in the case of injury of a vaccinated individual carrying the risks of tetanus infection. Is it safe to omit the administration of antitoxin? I believe it is, providing the individual has been vaccinated within a year and providing 1 cc. of the toxoid is given at once for secondary stimulation. But if more than a year has elapsed, I believe it is too risky to take a chance and that antitoxin should be given for immediate protection, followed at the same time by the injection of 1 cc. of the vaccine.

Scarlet Fever. Numerous reports have been made indicating the value of scarlet fever vaccination in institutions as well as on large-scale immunization programs other than that in institutions with the result that physicians should be encouraged to immunize children against scarlet fever in private practice. One drawback is the necessity for using five injections of the vaccine which, because of economic and administrative difficulties along with failure to secure complete cooperation on the part of the public, has made mass immunization impossible. Furthermore, scarlet fever immunization is not quite as effective as vaccination against diphtheria because the immunity is not as lasting and because it is possible for individuals to contract local infections with the streptococcus without the development of the rash (scarlatinae sine eruptione).

Five doses of the toxin vaccine are advised by subcutaneous injection at weekly intervals (650, 2500, 10,000, 30,000 and 100,000 or 120,000 skin test doses respectively). The Dick test is not required in children under five years of age because the great majority are susceptible. It should be conducted, however, in older children and adults as only positive reactors are susceptible and require vaccination. Reactions are not as frequent or as severe as formerly observed. The Dick

test should be conducted one week after the last injection. Toxoid has not proven as effective. Oral immunization may be possible but its value has not yet been proven.

Pertussis. The seriousness of pertussis and especially its relatively high mortality renders the vaccination of nurslings and young children highly advisable as a routine measure in private practice. About 10 or 15 per cent failures may be expected but the percentage of successful immunization is sufficiently high to warrant the general adoption of vaccination. Even if it fails to give complete protection the disease is usually less severe with less danger from bronchopneumonia and other complications. The immunity lasts for at least 5 to 8 years, which covers the age of greatest susceptibility and danger. Furthermore, it is always likely that natural immunization will thereafter prolong the period of immunity which under such circumstances may endure for the balance of life.

The Sauer vaccine is recommended. Three strengths are available. One carries 10 billion per cubic centimeter and a total of 8 cc. is given. A second (intermediate) carries 15 billion per cc. and a total of 7 cc. is given. A third carries 20 billion per cc. and a total of 5 cc. is given. Any one of the three may be used. The total is divided into three doses given at intervals of one to three weeks. Two injections in different sites are given each time.

The Common Cold. The infectious common cold is due to a virus. At the present time there is no effective method for vaccination against it. The virus, however, lowers resistance to secondary bacterial infection and the latter is responsible for the prolongation of the disease as well as for sinusitis; pharyngitis and bronchitis. Vaccination is directed against this important secondary bacterial infection. Stock "catarrhal" vaccines may be used but I prefer autogenous vaccines made up to carry a total of 1000 billion per cc. For adults six injections are given at weekly intervals beginning with 0.2 cc. Thereafter one injection (0.5 to 1 cc.) is given monthly throughout the season to maintain immunity. I believe it is decidedly worth while as it appears to be effective in at least 60 per cent of individuals. It should not be used, however, if chronic sinusitis, polyps, deviated septa, etc., are present unless proper surgical and local measures are first employed because "colds" in such cases are not usually due to the virus but really exacerbations of chronic bacterial infections of the upper respiratory tract. The value of oral vaccines is undecided and their value cannot be stated at the present time. At least they are well borne and some believe that they are worth while. If given, a capsule is taken with cold water before breakfast once a day for seven days in succession followed by one a week for about fourteen weeks.

Influenza. Influenza is due to a filterable virus. It has been successfully cultivated and some attempts have been made to use it in vaccines for active immunization against the disease but their value has not yet been determined. There is, therefore, no method at present for vaccination against either endemic or epidemic influenza. Certainly vaccines of *B. influenzae* (*Hemophilus influenzae*) have failed. Indeed, the organism is a misnomer as it has nothing to do with the primary etiology of the disease although it may be an important secondary invader.

Tuberculosis. As previously stated, no success has attended vaccination against tuberculosis with vaccines of dead tubercle bacilli. Calmette has used a vaccine of living bacilli completely attenuated or rendered non-virulent by prolonged cultivation on a bile medium. The vaccine is given orally to infants soon after birth with the idea of producing mild infections of the mesenteric nodes sufficient to induce tuberculin hypersensitiveness and enough immunity to afford protection against the disease. The vaccine has also been given intracutaneously or subcutaneously. These methods, however, have not been widely adopted in this country. Some have thought that the vaccine may be dangerous but this has not been proven with the BCG vaccine. At the present time it would appear that vaccination against tuberculosis may be possible with this vaccine but its exact value is still unknown.

Typhoid - Paratyphoid Fevers. Uniform agreement exists at present as to the efficacy of vaccination against typhoid and para-

typhoid fever. More than thirty years' experience, especially in the Army, have definitely established its value. While it is not always effective yet there is little or no doubt but that it has lowered the morbidity of the disease. Individuals residing in hygienically well-regulated communities may be exposed to infection when traveling in areas in which unsanitary conditions exist. Families of patients who have typhoid fever and the physicians, nurses and others who are in attendance, are likewise exposed and may contract the disease in spite of adequate sanitary regulations. It is highly desirable, therefore, for individuals to be protected by vaccination.

The vaccine should be prepared of the Panama carrier strain No. 58 of the typhoid bacillus. Three injections are given by subcutaneous injection of 0.5, 1 and 1 cc. for adults. at weekly intervals. The intracutaneous injection of 0.1, 0.15 and 0.2 cc. probably gives a higher immunity. The duration of the immunity is neither definitely known nor easily determined by immunological methods. Apparently it endures for at least 3 to 5 years. For re-vaccination at the expiration of this time probably one or two doses suffice.

Rabies. The value of vaccination against rabies is difficult to express accurately although no one can question that it has greatly reduced the incidence of the disease. Available evidence indicates that about 25 per cent of unvaccinated, exposed individuals develop the disease and recovery is unknown. The attack rate among vaccinated individuals on the contrary has been reduced to between 0.15 to 1.5 per cent.

The Semple phenolized vaccine is mostly employed in dose of 1 cc. by subcutaneous injection at daily intervals for fourteen days. It should be started as soon as possible when rabic infection is suspected and especially in the case of bites about the face, head or hands.

Vaccination is required (a) in bites by dogs known to have rabies; (b) when there are abrasions or fresh wounds known to have been contaminated with the saliva of a rabid animal; (c) when individuals have been bitten by a suspected dog which cannot be located; (d) when a person is bitten and the dog killed before Negri bodies occur in the brain and (e) in the case of individuals bitten by a rabid animal six or more months after previous antirabic vaccination.

It is not required (a) when the dog is confined and observed for two weeks without evidences of rabies; (b) where there is mere contamination of the skin with saliva without wounds or scratches; (c) when objects contaminated with saliva are handled and (d) when foods possibly contaminated with saliva are taken.

The vaccine is generally well borne; "treatment paralysis" is rare and especially in children but the vaccine should never be given until the possibility of its occurrence has been explained. The duration of the immunity is unknown but probably endures for only six months to a year.

Rocky Mountain Spotted Fever. Rocky Mountain spotted fever is due to the *Rickettsia dermacentroxemus* transmitted to man by various ticks including those of dogs. It occurs in both a western and eastern type and many cases have been reported in New Jersey and other eastern states.

The Spencer-Parker vaccine is prepared by grinding up highly infected ticks with 0.5 per cent phenolized saline solution and using the filtered supernatant fluid. It may be obtained by physicians from the National Institute of Health, Washington, D. C., or from the U. S. Public Health station in Hamilton, Montana. The dosage for adults is 2 cc. (1 cc. for children) by subcutaneous injection. Two or three doses at 5 to 7-day intervals generally suffice. The reactions are seldom severe. In endemic areas the vaccine should be given once a year before or early in the tick season.

No broad generalizations can be made relative to the vaccination of persons living in the eastern states. The incidence of the disease is too low to warrant wholesale immunization. It might be stated in a general way that vaccination should only be carried out in the case of individuals who are likely to have considerable exposure to ticks in definitely infested areas.

Equine Encephalomyelitis of Man. This disease of horses and mules is due to a filter-

able virus and is sometimes transmissible to man. Pigeons and Pheasants may be natural reservoirs. It is transmitted by mosquitoes and especially *Aedes aegypti*. Fortunately the disease is rare in human beings; about 70 per cent of cases occur in children. Adults may be attacked and especially those exposed to the virus by occupation. The mortality is very high.

The virus has been cultivated and at least five different strains have been identified. Vaccines of formalized culture virus have proven highly effective. Two doses of 2 cc. each by intramuscular injection with an interval of a week have been advised in the case of veterinarians, laboratory workers and others exposed to the disease. The duration of the immunity is unknown at the present time.

Acute Anterior Poliomyelitis. This disease is also due to a filterable virus. It is likely that different strains exist. Formalized spinal cord (monkey) virus (Park-Brodie) has failed as a vaccine in active immunization against the disease. A vaccine of living attenuated virus (Kolmer) is believed to be effective but probably too dangerous for use. There is therefore no method available at present for vaccination against infantile paralysis. Armstrong has succeeded in transmitting the virus to the wild cotton rat. This in turn has been transmitted to mice. Jungeblut has recently stated that the murine virus can be cultivated and that its virulence has been greatly reduced for monkeys with encouraging results from vaccination. I believe that living virus may be used for active immunization and if rat-mouse passage virus shows complete loss of infectivity for man it may well be that a safe and effective method for vaccination will be produced which may prove of practical value and especially if the mouse-serum protection test of Armstrong serves the purpose of detecting susceptible children for vaccination.

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DISCUSSION

DR. JOSEPH R. BECK (Dover): I am sure we greatly appreciate Dr. Kolmer's coming down to talk to us, and we are very glad to have had the privilege of listening to such an authority.

It is very nice to know that the Treponema pallidum has been cultured now, also the virus of the cold and of influenza.

We have no smallpox in this state. However, we are protected by Maryland which has a compulsory smallpox law, and by Pennsylvania and New Jersey. And it is compulsory in Wilmington. But downstate the law is not compulsory and I think that it would be well if something were done at this next session of the Legislature to put through such a bill. An attempt was made in the 1935 session, I believe, and the attempt was unsuccessful. We have not had a case of smallpox in Delaware since 1934, and there was some doubt about that case.

Dr. Kolmer talked about vaccination in the fall and winter months in preference to the rest of the year. Probably it would be better to vaccinate in the fall rather than in the winter because the children wear heavier clothing in winter and it might be a little more irritating to the vaccinated area.

As far as diphtheria goes, we have only had nine cases in the state this year, and no deaths. We had two deaths last year, and thirty-five cases. This improvement was due, I think, to the immunization work which has been carried out in the state.

There is a question I would like to ask Dr. Kolmer about alum precipitated toxoid. We found that by giving one dose of alum precipitated toxoid we would protect about 88 per cent of our children; two doses would protect about 96 per cent, make them Schick negative. Why not give two doses of alum precipitated toxoid rather than two doses of plain? You would get the same effect.

Then, there are a few people in this state who say that we can immunize too many children against diphtheria, that we may get too large a percentage of our population immunized and then there won't be enough people to carry the diphtheria organism around to induce an artificial immunity. That is actually the case; we have some people here who believe that. I want to ask Dr. Kolmer whether we can immunize too many people in the state against diphtheria.

The State Board does advocate toxin-antitoxin for all people over fourteen years of age who are Schick positive, and it is sup-

plied to any physician free, upon request to the State Board.

Pertussis killed more children in Delaware than scarlet fever and diphtheria. Last year we had seven deaths from whooping cough. I think, if I remember rightly, we only had three from scarlet fever, and of course the two from diphtheria.

I would like to ask Dr. Kolmer a question about typhoid vaccine. Some people are advocating an intradermal injection of a small quantity of typhoid vaccine. I wonder whether or not that increases the titer as much as a cc. of the vaccine would do—after the person has been immunized, three or four years later you give him another dose. I wonder whether or not if you give it intradermally it increases the immunity as much as the regular way.

We have had no human rabies in the state, but we have had a number of positive heads, particularly in the Wilmington area. And as you know from the papers we did have quite a rabies quarantine on through the aid of the Fish and Game Commission and the Board of Health. The killed simple vaccine is supplied for patients who are indigent, who are unable to purchase the vaccine. We have it in seven-dose packages so that a supply can be started immediately, and as the doctor has said, if the head is negative, they can stop it. In that way we don't lose a 14-dose package, we give it out in 7-dose packages, and that suffices.

Rocky Mountain spotted fever vaccine is available here in the state to physicians. We get it from Hamilton, Montana. We keep a supply in the laboratory, and a number of the Wilmington physicians have been using it. We did administer the vaccine to some of the Soil Conservation group in the Newark area. We have had eight cases of Rocky Mountain spotted fever this year, which were authenticated by X-19 agglutination.

We are grateful to Dr. Kolmer for coming down here and giving us such a splendid talk, and thank him very much.

DR. CHARLES E. WAGNER (Wilmington): Mr. President, Ladies and Gentlemen: I, too, am very grateful to Dr. Kolmer for coming down and being so specific in his statements as to when immunization ought to be attempted. A good many people have advocated immunization against diphtheria, for instance, at six months of age. Others feel that it would be well to wait until approximately nine months of age, and some of us have been going on that theory, that a higher percentage of immunity is established if children are immunized at that age.

However, there is a higher incidence of whooping cough, and of course the mortality is higher from that disease. I was pleased to hear him say that he felt immunization against whooping cough ought to be done at nine months of age rather than against diphtheria. I have wondered, however, about the combinations of immunization, for instance, immunization against diphtheria and vaccination against smallpox at the same time, on the principle that injection given against diphtheria will cause a reaction probably within twenty-four hours, whereas that against smallpox will not cause much fever or reaction until six, seven, or eight days have elapsed. Do you recommend immunization against diphtheria and vaccination against smallpox in a combination of that kind?

Also, in immunizing against whooping cough, do you approve or recommend the concentrated serum which can be given in three different doses instead of the regular Sauer's vaccine which must be given in six injections, an injection in each arm at three different visits, whereas with the concentrated serum the first injection of 1 cc. can be given, and at subsequent visits at intervals of a week 2 cc. can be given at each injection, and thereby the number of injections will be diminished.

I have found, as many others have, I presume, that as soon as we begin injections against various diseases in children our popularity diminishes. It takes a considerable time to win back the confidence of a child who after we have once begun the use of a hypodermic needle. I am also especially interested in the time intervals between immunizations, how close they can be done, for instance. So physicians will immunize against all three diseases—diphtheria, whooping cough and smallpox—within the first year; that is, they will begin at six months of age and possibly give the whooping cough serum;

at nine months of age give the diphtheria toxoid; and by the end of the first year also vaccinate against smallpox. Is it permissible or advisable to immunize so closely against those diseases, or would it be advisable, as many feel, to allow an interval of at least six months to elapse between immunization against these various diseases?

I do want to thank Dr. Kolmer very, very much for his comprehensive and very specific remarks about all these diseases against which it is possible to immunize children. Thank you!

DR. GEORGE J. BOINES (Wilmington): Mr. Chairman, Ladies and Gentlemen: I was glad to hear Dr. Kolmer's paper on the question of immunization. We have been so in the habit of associating vaccination and immunization with children that we have forgotten the value of vaccination against scarlet fever and diphtheria in adults. This is especially true of the nursing staffs of the Wilmington hospitals, four main hospitals. In the last five years there have been seventeen nurses sick with scarlet fever, and five nurses who contracted diphtheria. Four of the cases of scarlet fever and two of diphtheria were contracted while affiliated with the Doris Memorial Hospital.

Up to this year the hospitals have required that all the student nurses coming in must have smallpox vaccination, the typhoid inoculation, the Dick test, and the Schick test, but they do not require and do not compel the immunization of the positive reactors against the Schick and against the Dick and the scarlet fever tests. The result has been that these nurses developed scarlet fever and diphtheria when they began to affiliate at the contagious hospital.

This year the Wilmington General Hospital will begin a program in which they will require the smallpox and the typhoid immunization, as usual, but will also do the Dick test and the Schick test on all the nurses, and those who are positive to the Schick test will be immunized with the toxin-antitoxin, the usual three injections, until they are negative to the Schick; and those positive to the Dick test will be immunized by the usual Dick method, five injection-method, according to the reaction which they show.

I want to ask Dr. Kolmer whether he thinks that is an adequate program of immunizations for the nurses, or whether he thinks any other method will better protect the nurses against contracting these diseases while in regular hospitals or in contagious hospitals.

DR. KOLMER: In answer to the first inquiry as to the possibility of our overdoing immunization against diphtheria, from the standpoint of cutting down clinical immunization through unrecognized attacks, I have likewise heard that objection raised. I have no sympathy with it at all, because vaccination against diphtheria will probably never completely remove the carrier problem.

Relative to the second inquiry regarding the value of giving typhoid vaccine intracutaneously: My assistant, Dr. Louis Tuft, has been one of our most earnest students here in America on this method of immunization, and I have been able to follow his work carefully and with interest. I think it can be definitely stated that three doses of typhoid vaccine intracutaneously will probably give a higher degree of immunity than three doses subcutaneously. The first dose is .1 cc., the second 0.15 cc. and the third 0.2 cc. In the case of individuals who require revaccination at the end of four years, it would appear that one dose of 0.2 cc. intracutaneously is sufficient. The only drawback to the method is somewhat larger local reactions; but on the other hand the general reactions are fewer and less severe. Personally, I am very much in favor of it.

Incidentally, I may state in passing that as physicians we make a great mistake in over looking the value of giving vaccines intracutaneously in the treatment of disease, because intracutaneous injections are now pretty well known to give a better immunity response.

In reply to the third inquiry about the advisability of vaccinating a child against smallpox and diphtheria simultaneously, I personally see no objection to it. We know that our body cells can produce antibodies for as many as six or seven different antigens given at the same time. I believe, however, that this must be decided upon according to the health of the child. I do it occasionally, but only in the more robust children. Where

there is no need for haste I think on general principles we do well to give them on separate occasions.

In reply to the fourth inquiry about pertussis vaccine, it is true that the ordinary Sauer vaccine carries ten billion per cc. One is required to give the child between seven and eight cc., but the double strength pertussis vaccine that carries twenty billion per cc. may be obtained where the three doses are contained in a total of 5 cc. The only thing to do is to make sure that the child gets the total number of killed whooping cough bacilli.

I am opposed to immunizing any children under nine months of age with anything except possibly in the case of cowpox vaccination. I think we can vaccinate children at two to three weeks of age before they leave the maternity hospital. As a matter of fact, this may be a good thing to do. We know from the immunologic standpoint that the tissues of the young during the state of immaturity are not as good antibody producers as are the tissues of older children. Consequently, I am in favor of beginning the immunization program at about nine to twelve months of age, and beginning with whooping cough, following in the order previously stated.

In conclusion, I believe that the program that has just been announced relative to the immunization of nurses is an excellent one. It is identical with the one we use at the Temple University Hospital in Philadelphia. No nurse should be admitted to a nursing school who has not been successfully vaccinated against smallpox. No nurse should be admitted who hasn't been successfully vaccinated against typhoid and para-typhoid fever. Furthermore, I think it is well to do the Schick test and to vaccinate the positive reactors, and to do the Dick test and vaccinate the positive reactors with the five doses of scarlet fever toxin vaccine. Certainly, no susceptible nurse or interne would be admitted to the Philadelphia Hospital for Contagious Diseases until they have been vaccinated against diphtheria and scarlet fever.

A few years ago it was estimated that during a period of five years there were 213 nurses and internes treated at the Philadelphia Hospital for Contagious Diseases who had contracted diphtheria and scarlet fever in other hospitals in the city because they were not immunized. At this Hospital the vaccinated nurses and internes were intimately exposed to both diseases almost daily during that same period of four years and there were only three cases. So there can be no doubt about the wisdom of these procedures in relation to diphtheria and scarlet fever among nurses and physicians.

IMMEDIATE ALLERGIC REACTIONS TO THE SCHICK TEST

JOSEPH R. BECK, M. D.*
Dover, Delaware

Allergic reactions following the Schick test have been reported. Parish[1] in England 1936 reported on 14 cases, seven of which he collected from the literature, four that he knew about, and three cases of his own. Keller and Harris[2] in 1936 reported two cases.

While Schick testing Wilmington school children in March, 1940, three immediate allergic reactions occurred.

CASE 1

R. A. L., Jr., 10 years old, male, white, a physician's son, had a negative Schick test January 12, 1933, and one dose of alum precipitated toxoid June 2, 1937. He had been Schick tested twice by me, on October 29, 1937 and November 30, 1938, and found to be negative both times. On March 5, 1940, he was again tested and within twenty minutes developed a marked erythema. Before the boy's condition was reported to us, the nurses and I had left the school. The boy's father was communicated with and when seen by him an hour or so later, he had marked erythema with some urticaria, and edema of the face and eyelids. He was nauseated and appeared quite ill. He was taken to a hospital and given 4 minims of adrenalin chloride solution 1:1000. When seen by me several hours later he had fully recovered except for slight erythema and a little circumoral pallor. There was no previous history of any allergic manifestation in this patient.

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CASE 2

E. N., 8½ years, female, white, who had received plain toxoid April 3, 1932, and April 27, 1932, was Schick tested November 10, 1937, and found to be positive. Alum precipitated toxoid was then given November 17, 1937. On December 1, 1938, she was again Schick tested and within 15 minutes after the administration of the test developed a generalized erythema, and some urticaria which subsided in a few hours with no specific treatment. On March 6, 1940, this child was again inadvertently Schick tested and within fifteen or twenty minutes developed a marked erythema, some urticaria, became restless and nauseated, and had marked edema of the face, the eyes almost becoming completely closed. There was a large wheal at the site of the Schick test. Adrenalin chloride, 4 minims of 1:1000 solution, was given about one hour after the onset of symptoms and there was prompt relief, although the erythema did not completely disappear for about another hour. The child was taken home, and bed rest advised until the next day. However, this advice was not followed and she attended the afternoon session of school. No history of other allergy in the child or immediate family was obtained.

CASE 3

A. M. McC., a white girl, aged 8½ years had previously received two doses of plain toxoid April 13, 1932 and May 4, 1932. She was Schick tested November 10, 1937, and found to be positive; she received alum precipitated toxoid November 17, 1937, and on December 1, 1938 was found to be Schick negative. March 6, 1940 she was again tested, and within fifteen to twenty minutes after the test she had generalized erythema with some urticaria, and edema of the face. Four minims of adrenalin chloride 1:1000 solution was administered within ten minutes after the onset of symptoms, and the condition was relieved in a short time. The child's mother stated that there was no history of hay fever, asthma or eczema in the family.

The Schick tests which caused these reactions gave negative readings in all three children. These cases show that allergic reactions may occur in children who have been previously Schick tested. Hypersensitive individuals may become sensitized to one of the proteins in the Schick material, or in the alum toxoid, and on subsequent Schick testing an allergic reaction may occur. This is a relatively infrequent occurrence, however, because of 15,726 Schick tests personally administered in the past four years, there were but three individuals who reacted in this manner, and in the group tested at least 4,000 individuals have received two or more tests.

Practicing physicians should not be unduly concerned about reactions following the Schick test, but adrenalin is a very handy drug to have at hand in the event that it might be needed, particularly so if the individual is being re-Schicked or has had alum precipitated toxoid. [3]The knowledge that a tourniquet tied tightly enough to stop the pulse will prevent rapid dissemination of the injected material, is a procedure emphasized by Duke which may be of greater importance than the injection of adrenalin chloride. This was not done in the three cases reported here, however.

SUMMARY

Three cases of immediate allergic reaction to the Schick test are reported. All reactions occurred in children who had previously been Schick tested, and all had received alum precipitated toxoid prior to the previous Schick tests.

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PURPOSES OF "WAR MEDICINE"

War Medicine, a new bimonthly periodical being published by the American Medical Association, Chicago, in cooperation with the National Research Council, Washington, D. C., is being offered as a means of making an adequate record of the contribution of the medical profession to the nation's defense, an editorial in the first issue of the publication states. The editorial says:

"The problems involved in medical care of troops in training and in the field, of men on battleships and submarines and of pilots, observers and gunners in the air are specialistic aspect of medical practice with which

few civilian physicians are familiar. The peculiar nature of wounds resulting from gunshot and explosions, the physiologic changes associated with life aboard a submarine and the extraordinary hazard of infections when hundreds of thousands of men are closely crowded in barracks create hygienic and sanitary conditions to which few physicians in civilian life have given serious consideration. Yet all of these factors may become at any moment the intimate and immediate concern of any and every physician in the United States.

"In previous military emergencies American physicians have not been found lacking. Whenever called on, they have given of their utmost for defense or for attack. Well nigh one-third of the physicians in the United States were engaged in some activity related to the preparedness of the nation in World War I. Even a greater number might be required in contingencies now in prospect should the country be drawn into the present conflagration.

"Last spring the Surgeons General of the Army and Navy addressed the Division of Medical Sciences of the National Research Council and the House of Delegates of the American Medical Association, requesting the cooperation in the standardization of medical procedures to be used for the Army and Navy and in the securing of adequate personnel. Both of these agencies responded promptly with the setting up of suitable mechanisms to meet these requirements. Soon it became apparent that a medium was desirable for the recording of such procedures as might be adopted, of the results of research projects under the control of the National Research Council and of information concerning problems of personnel. Dissemination of information in matters of this type is in itself a procedure that requires special training. Early, therefore, in its work the Division of Medical Sciences of the National Research Council set up a Committee on Information and selected the editor of *The Journal of the American Medical Association* as chairman of that committee. Associated members are editors of other publications in the field of medicine, librarians familiar with medical literature, medical historians and representatives of the various governmental services. When the Trustees of the American Medical Association, in pursuance of the desired objective, determined to aid in this project by the publication of a periodical to be devoted wholly to medical preparedness and war medicine, the Committee of Information of the Division of Medical Sciences of the National Research Council was chosen to act as the editorial staff.

"The material here published is authentic to the extent that it has passed the surveillance of members of this committee. Each of the original contributions has been considered by an expert in one of the numerous special committees of the Division of Medical Sciences of the National Research Council. Elsewhere in this issue appears a complete statement regarding the organization of this work, as well as the present status of the activities at the headquarters of the American Medical Association in the development of a bank of information concerning physicians available for the Army, for the Navy, for industry, for public health work or for other important purposes. The editorial board of *War Medicine* hopes to be able in future issues not only to provide the official reports of special committees, similar to the circular letter on chemotherapy in this issue, but to make adequate record of the contribution of the medical profession to the nation's defense."

EDITORIAL

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ARNOLD MOVES AGAINST MEDICINE

Just as we go to press we find a dispatch in the *Wilmington Journal-Every Evening*, which describes Thurman Arnold's latest moves in his efforts to have the practice of medicine declared legally to be a trade, and thereby, indirectly, to force upon the profession a consent decree, of his own making, which would be the entering wedge for compulsory health insurance, under Federal domination. The dispatch follows:

> Three medical societies and 21 of the country's leading physicians were summoned today to stand trial in district court on once-quashed charges of violating the Sherman anti-trust act.
>
> The government after almost three years of litigation brought back for consideration an anti-monopoly suit against the American Medical Association, the District of Columbia Medical Society, the Harris County, Texas, Medical Society and the 21 physicians.
>
> The societies and the individuals were indicted by a District of Columbia grand jury on charges of "acting in restraint of trade" in refusing to cooperate with physicians of Group Health Association, an organization of federal government employes providing medical service on a pre-payment basis.
>
> In July, 1940 Justice James M. Proctor of the Federal District Court quashed the grand jury's indictment, terming it a "highly colored, argumentative discourse." His opinion was reversed, however, by the United States Court of Appeals and the case was remanded to district court.
>
> The defendants had contended that the practice of medicine was not a "trade" as defined in the Sherman anti-trust law but the appellate court declared in handing the case back to district court that "the field of commercial activity, ordinarily defined as a 'trade' embraces as well the field of the medical profession."
>
> Among the individual defendants named in the original indictment were Dr. Olin West, secretary and general manager of the American Medical Association; Dr. Morris Fishbein, editor of the Association's Journal; Dr. William C. Woodward, Dr. William D. Cutter and Dr. Roscoe E. Leland, heads of three of its Bureaus. The other defendants are members of the District of Columbia Medical Society.

If the medical profession cannot discipline its members—one of the issues at bar—what about the labor unions? Where are we all heading?

SENATOR WAGNER AGAIN

Early in January, Senator Robert F. Wagner of New York gave out a statement to the Associated Press in which he said that he and others would sponsor a comprehensive proposal for an expanded national health program in line with President Roosevelt's call for widened opportunities for adequate medical care. A few days later the Association received a bulletin from the American Medical Association indicating that Senator Wagner's plan will provide for federal and state cooperation in a broad program calculated to cost $98,000,000 in the first year.

It was pointed out in the Associated Press item that Mr. Wagner had conferred with the President before the President's message to Congress was delivered on January 6, and had said that it is likely that an expansion of health facilities can be worked out in connec-

tion with the defense program. The general health program as tentatively outlined will call for cooperation between federal and state governments in construction of hospitals, payment of compensation for disability wage losses and expansion of maternal, infant, child health and welfare service, general public health services and general medical care.

The sum of $35,000,000 is mentioned as the amount to be available during the first year for the operation of approved state plans for medical care. Appropriations of $10,000,000 in federal grants for temporary disability compensation, $8,000,000 for hospital construction, $13,000,000 for medical services to children, $15,000,000 for general public health work and $8,000,000 for maternal and child health service are to be authorized, and smaller amounts are to be set aside for administration and for investigations.

Copies of Senator Wagner's bill had not yet been received at press time. A complete analysis of the bill will be made and published in the *Journal of the American Medical Association* just as soon as copies are available. In making this analysis the A. M. A. might call attention to the fact that this proposed type of bureaucratic medicine originated in Germany, the country of Senator Wagner's birth.—Editorial, *W. Va. Med. Jour.*, February, 1941.

PUBLIC NOT PARTICULARLY ENTHUSIASTIC ABOUT PREPAYMENT MEDICAL SERVICE

Discussing programs for providing medical care which are being tried out by various state medical societies, *The Journal of the American Medical Association* for February 1 says that: "One difficulty seems to be common to all these plans. The public is not particularly enthusiastic about prepayment for medical service. There is no evidence that the citizens of this country are yearning for any universal compulsory system.

"Physicians were cognizant of the problem of providing good medical service to the indigent and low income classes long before social reformers began to take the problem into politics. And the medical profession did something about it! Fred DeArmond, 'Cutting the Doctor's Bill to Fit,' in *Nation's* Business for November, is impressed by two different types of approach:

"Doctors try a new procedure on a guinea pig first. If it works, they use it on a patient.

". . . Social reformers . . . experiment on the whole nation and, if there isn't too much revolt, they then test the procedure on a guinea pig.

"Between 1932 and 1938 more than 200 county medical societies entered into agreements with relief authorities to provide medical care for the indigent. In twenty-six states, county medical societies cooperated with the Farm Security Administration in trying out plans to provide medical service to the low income classes. Not all of these plans were a success and physicians did not expect them to be. They were frankly experiments. Organized medicine also experimented with medical service bureaus through which the indigent were 'filtered' to the proper source of medical service and which made arrangements for convenient postpayment plans. Some of these experiments failed, but something was learned from each of them. And the whole nation was not used as a guinea pig. In a number of states, prepayment plans are now being introduced on a statewide basis. Sometimes an enabling act of the state legislature has been required. The state plans are not all alike. Michigan, California and New York, where the plans have actually gone into operation, differ in a number of minor details. In Wisconsin several plans were tested. The state medical society in every case is watching not only its own plan but those of all other states engaged in such an experiment. Unlike many social reformers and critics, the medical profession will abandon any of the features of a plan that prove unsatisfactory or may adopt any more successful features from other states."

SELECTIVE SERVICE

My dear Dr. Bird:

Receipt of your courteous letter in which you ask for a list of boards on which Delaware physicians are serving, is acknowledged.

I am glad to send you a list of the physicians who are serving as medical examiners for the local boards, as well as those who serve at the call of the medical examiner for each board. The list also includes those physicians

who are members of the medical advisory boards.

I will have to refer you to Lt. Col. John F. Daye, Recruiting Officer for the Delaware District, Post Office Building, Wilmington, Delaware, for the list of men who are serving as members of the induction board for Delaware.

The examination of registrants called for physical examinations include urinalysis and blood serology for syphilis. All registrants who are found otherwise physically fit are to have an x-ray of the chest.

Permit me to take advantage of this opportunity to convey through the medium of the Delaware State Medical Journal to the medical profession of Delaware, the hospitals, the State Board of Health, the Brandywine Sanatorium, the Delaware Anti-Tuberculosis Society, and all others who have in one way or another given so generously of their services, our sense of appreciation and gratitude for the whole-hearted and full cooperation which has been so evident on all sides.

We are deeply indebted, particularly to the members of the medical profession of Delaware who have so cordially assisted us in the administration of Selective Service in our beloved State.

Very truly yours,
Wm. Berl, Jr., State Director.

(Ed. Note.—These lists were published in the November issue.)

DELAWARE ACADEMY OF MEDICINE

The annual meeting of the Academy was held January 28, 1941. Reports showed a very successful year, with increased activities in all departments. Elections for the year beginning April 1, 1941, resulted as follows:

Officers—President, W. H. Kraemer, M. D.; First Vice President, E. R. Miller, M. D.; Second Vice President, G. W. K. Forrest, M. D.; Secretary, D. T. Davidson, Sr., M. D.; Treasurer, N. L. Cutler, M. D.

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NEW SULPHA DRUG FOR DYSENTERY, ETC.

Spectacular results with a new sulfa drug in fighting germs that threaten lives of patients requiring operations for cancer or other diseases of the lower alimentary tract were announced by Dr. Warfield M. Firor, acting chief surgeon, Johns Hopkins Hospital, and acting professor of surgery, Johns Hopkins Medical School, at the recent meeting of the Southern Surgical Association at Hot Springs, Va.

The new sulfa drug is sulfanilylguanidine. This is the first report of its use on patients. Tests of it on animals, reported in September by Dr. E. K. Marshall of Johns Hopkins Medical School, showed that it might prove very effective in fighting such intestinal tract diseases as bacillary dysentery and typhoid fever.

These tests showed that the new drug was fairly soluble in water but that, unlike other of the sulfa drugs, it is very poorly absorbed from the digestive tract. This means that almost all of it stays in the lower alimentary canal where it is needed to "blitzkrieg" the germs there in cases of dysentery or in other conditions.

Dr. Firor reported that giving patients the new sulfa drug before operation frees the alimentary canal of germs. In every case so

far the wounds have healed without infection. Every patient has survived the operation, although mortality in operations of this type at the very best hospitals has been as high as 10% to 15%. Patients not only survive the operation with the aid of the new drug but can go home from the hospital much sooner than usual because the wound, being free from infection, heals more rapidly.

The fall in number of germs in the alimentary canal when "blitzkrieged" by sulfanilylguanidine is "phenomenal," Dr. Firor said. In one case the bacterial count dropped from 17,000,000 to 10,000. The reduction in number of bacteria was not this striking in all cases, but was always sufficient to enable the surgeon to perform a successful operation without infection.

Further advantage of sulfanilylguanidine is that it is less toxic than any of the other sulfa drugs. It is given by mouth. No patient has had nausea or vomiting from it.

The 15 or more patients who have now survived operations with the aid of the new drug required operations involving removal of a part of the alimentary canal or restoration of the canal after temporary drainage to the outside had been made in previous operations.

Sulfanilylguanidine, under the federal food and drug restrictions, has not yet been released for general sale, but is being distributed, Dr. Firor said, to a number of surgeons for further study of its effects.

On the medical side, sulfanilylguanidine has been used with gratifying results in treatment of acute bacillary dysentery. Dr. Marshall expects to report soon on trials of the drug now being made in Puerto Rico, where dysentery occurs the year round. He stated that it was used in dysentery outbreak in Huntington, W. Va., this fall. The majority of 20 patients treated with sulfanilylguanidine got well within three or four days, while 20 patients who were not treated and served as controls were sick for two or three weeks.—*Victor News,* January, 1941.

PLASMA PROTEIN FOR BURNS

Of the 5,000 deaths each year in the United States, attributed to the effect of severe burns, many could undoubtedly be avoided by adequate treatment by means of transfusions of plasma (fluid portion of the blood) protein, aimed at replacing the substances lost by the body in this serious type of injury, Robert Elman, M. D., St. Louis, declares in *The Journal of the American Medical Association* for January 18.

The pessimism often expressed as to the outcome of extensive burns is fallacious, Dr. Elman believes. It is based "on the inference that, since large areas of skin are involved, it will be impossible to obtain a sufficient amount of normal skin for skin grafting later. This idea is often erroneous as far as the burn turns out to be first or second degree and therefore requires no skin grafting whatever. It is obvious then that, if these patients could be carried over the acute stage of their disease and the general manifestations corrected, not only would lives be saved but further treatment would become unnecessary."

Dr. Elman advocates that the protein lost because of severe burns be replaced by means of transfusions of plasma. Although some authors have advocated the administration of sugar and salt solutions, it is his opinion that the giving of these fluids alone in burns "is not only often ineffective but may, if excessive, be actually dangerous."

In describing the mechanism involved in the treatment of burns, the author cites the opinion of another investigator, who believed that the essential object is to keep the blood concentration near a normal level until the small blood vessels in the skin which have been injured by the heat have been able to repair themselves and have become capable of holding within themselves the fluid of the blood in a normal manner. This was estimated to require from twenty-four to forty-eight hours.

The great amount of plasma required to meet the loss is generally not realized, Dr. Elman says. He reported one case in which 20 cubic centimeters of blood per kilogram (2.2 pounds) of body weight, repeated each day for four days, was necessary. "This would correspond in an adult to transfusions

totaling 5,500 cubic centimeters (about 11½ pints) of whole blood," he points out.

"Because of the practical problem involved in giving 1,500 cubic centimeters of blood to an adult, the possibility of supplying at least part of the lost protein by the injection of amino acids (an important protein substance) is pertinent. While such a method of protein replacement is practical, its use in burns awaits clinical trial." He also believes that a high protein diet is necessary as soon as nourishment by mouth is possible.

"As a substitute for plasma protein, acacia (a gummy substance from the stems and branches of the acacia tree) has been used," the doctor says. "The beneficial effects of acacia are definite and such a solution is far superior to dextrose (sugar) and saline (salt) solution alone. Obviously, however, acacia is a foreign substance and if given in large amounts may be taken up by the liver and interfere with hepatic (liver) function. If possible, therefore, plasma is definitely preferable. I would use acacia only once and even then only in an emergency while waiting for the preparation of whole blood or plasma."

BOOK REVIEWS

Methods of Treatment. By Logan Clendening, M. D., Clinical Professor of Medicine, University of Kansas; and Edward H. Hashinger, M. D., Clinical Professor of Medicine, University of Kansas. Seventh Edition. Pp. 997, with 138 illustrations. Cloth. Price, $10.00. St. Louis: C. V. Mosby Company, 1940.

The seventh edition of this well-known text puts it in the foreground of those devoted to therapy. The first portion deals with drugs and therapeutic methods, while the second considers the application of therapeutics to particular diseases. One may find not only the details, but also the rationale of any contemplated therapeutic procedure, based upon the physiology, pathology, and pharmacology involved. Here and there a little well-seasoned philosophy is added. While the discussion of drugs is not encyclopedic in scope, it is quite adequate.

The chapters devoted to Extracts of the Endocrine Glands, to Immunologic Products, to Physical Therapy, and to Psychotherapy are particularly commendable.

The reviewer heartily recommends this text as a useful addition to any physician's library.

Clinical Pellagra. By Seale Harris, M. D., Professor Emeritus of Medicine, University of Alabama; assisted by Seale Harris, Jr., M. D., formerly Assistant Professor of Medicine, Vanderbilt University. Pp. 494, with 70 illustrations. Cloth. Price, $7.00. St. Louis: C. V. Mosby Company, 1940.

To those especially interested in pellagra and other deficiency diseases, this book will be very interesting. To those who are authorities in this field, it will probably bring little save a sobering influence. To the average practitioner, it will be very interesting and instructive not only as a treatise on pellagra, but also as a cause for reflection on the vast amount of work that has been and is to be done in this and other fields. The literature is well covered, the various workers are properly accredited, and a working bibliography is appended.

The author's own views are clearly stated, are not dogmatic, and offer many excellent suggestions for future investigation. The relationships of pellagra, of nicotinic acid deficiency, of porphyrin metabolism and of the sensitivity of pellagrins to light, to liver insufficiency is repeatedly questioned. Comments on the relationship of pellagra to pernicious anemia and sprue are as interesting as the author's views on the future prevention of the disease. The clinical diagnosis and treatment of pellagra are, of course, thoroughly covered. For its interest, its information, and its stimulative speculation, the author is highly commended.

Coffee: A Collection of Medical Abstracts. Foreword by Milton A. Bridges, M. D. Paper. 64 Pp. Published by the Pan American Coffee Bureau.

This scientific bibliography, with accompanying pertinent excerpts in condensed form from each reference, is the latest of its kind on coffee. Its purpose is best expressed by the late Dr. Milton A. Bridges in the foreword:

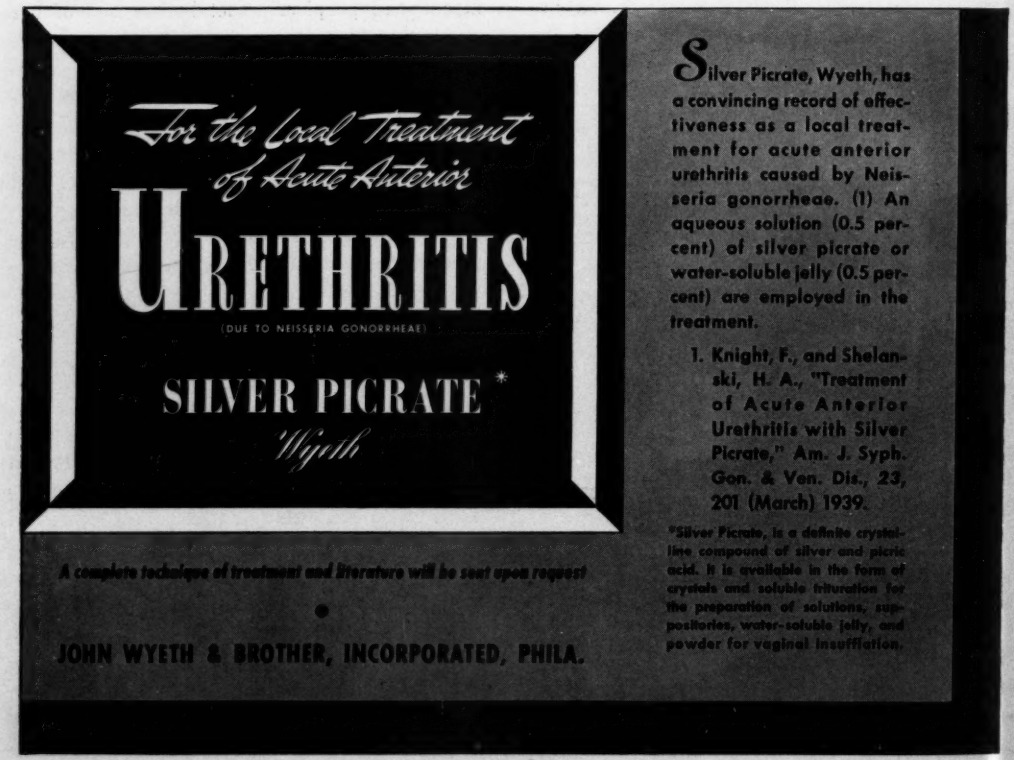
"Coffee has been the focus of so much exploitation, both honest and dishonest, both warranted and unwarranted, that a brief resume of the scientific viewpoint on the subject should be of interest . . . international literature has been carefully searched . . .

the gleanings are here presented in abstract form with no differentiation between favorable or unfavorable reports."

The synopses are arranged in alphabetical order according to authors. Accompanying the title and author of each source is a concise summary of the individual author's references to coffee and caffeine, and the pages upon which the complete text may be found. Excerpts are based upon clinical research and observation, laboratory tests, and other studies. The book is indexed. Titles and authors include: Materia Medica, W. A. Bastedo; Digestive Disorders, Albert W. Bauer; A Textbook of Pharmacology and Therapeutics, Arthur R. Cushny; Your Diet and Your Health, Morris Fishbein, and 120 others.

Electrocardiography in Practice. By Ashton Graybiel, M. D., Instructor in Medicine, Courses or Graduates, Harvard Medical School; and Paul D. White, M. D., Lecturer in Medicine, Harvard Medical School, in charge of the Cardiac Clinics and Laboratory, Massachusetts General Hospital. Pp. 319, with 272 illustrations. Cloth. Price, $6.00. Philadelphia: W. B. Saunders Company, 1941.

Neither cardiologist nor general practitioner will be disappointed in this book. Only the wealth of material and experience that are the authors' could make it possible. The first portion, containing 142 electrocardiograms, deals with their orderly interpretation. The second half contains 130 electrocardiograms and is intended for practice interpretation by the student. Pertinent clinical data and the proper interpretation is found on the page opposite each of these. An adequate discussion of the normal electrocardiograph and its variations is very welcome, as are also the electrocardiographic findings in infections, malnutrition, endocrine disturbances, cor pulmonale, drug intoxications, and other conditions. An unusual index is a ready reference for any type of electrocardiographic abnormality. The photography and printing are excellent. Simply planned and masterfully executed, this is indeed the practical presentation of this subject for which everyone has waited.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1. Knight, F., and Shelanski, H. A., "Treatment of Acute Anterior Urethritis with Silver Picrate," Am. J. Syph. Gon. & Ven. Dis., 23, 201 (March) 1939.
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